PATENT ABSTRACTS OF JAPAN

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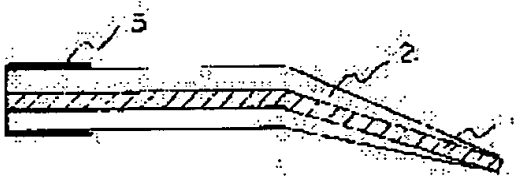
(54) PROBE PIN AND PROBE CARD

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a probe pin for a probe card and a probe card of high reliability, the probe pin being superior in spring characteristic and preventing contact resistance from temporally increasing.

SOLUTION: A clad wire formed of a noble metal or its alloy for its interior and of a metal with proper spring characteristic for its outer peripheral portion is used as the probe pin. The probe pin is used for the probe card.



LEGAL STATUS

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Au-Pd alloy

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* NOTICES *

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CLAIMS

[Claim(s)]
[Claim 1] It is the probe pin characterized by the periphery section being a clad line which consists of a metal with a sufficient spring property by the interior consisting of noble metals or its alloy in the probe pin used for a probe card.
[Claim 2] The probe card characterized by using patent claim claim 1.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to the suitable probe pin for the probe card and it which are used for the electric evaluation trial of a semi-conductor, a liquid crystal display, or various wiring substrates.
[0002]
[Description of the Prior Art] Before, the probe card which used the probe pin of a needle mold as shown in drawing 1 is used for the electric evaluation trial of a semi-conductor, a liquid crystal display, etc. When the pad which is the electrode terminal of a semi-conductor or a liquid crystal display which is a test objective object as a probe pin for probe cards is gold, beryllium copper, palladium, or its alloy is used.
[0003]
[Problem(s) to be Solved by the Invention] Although a spring property is good, since a tip oxidizes and corroded with time and contact resistance increased, it had gold-plated conventionally, but gold plate was worn out and it had the fault that contact resistance increased as the use count of the probe pin which used beryllium copper increased. On the other hand, although the increment in the contact resistance by aging had neither palladium nor its alloy, there was fault that a spring property was bad.
[0004] This invention aims at offering the probe pin which was made in order to solve the trouble of the conventional probe pin for probe cards mentioned above, is excellent in a spring property, and does not have the increment with time in contact resistance, and a reliable probe card.
[0005]
[Means for Solving the Problem] As for the probe pin concerning this invention, the interior consists of noble metals or its alloy, and it is characterized by the periphery section being a clad line which consists of a metal with a sufficient spring property. Moreover, as for the probe card of this invention, the interior consists of noble metals or its alloy, and it is characterized by the periphery section using the clad line which consists of a metal with a sufficient spring property for a probe pin.
[0006] While being able to abolish the increment in the electric resistance by the oxidization corrosion at the tip which is the electric contact section by using the interior of a probe pin as noble metals or its alloy with time, it can have electrical characteristics and a mechanical property by using the periphery section as a metallic material with a sufficient spring property.
[0007] As noble metals inside the probe pin concerning this invention, gold, platinum, palladium, and these alloys are desirable. Moreover, beryllium copper is [that the periphery section should just be a metallic material with a sufficient spring property] desirable although stainless steel is sufficient.
[0008]
[Embodiment of the Invention] Hereafter, the example of this invention is explained.
It passed [the 1st example] outside, the wire drawing was carried out by the wire drawing machine after inserting a palladium line with a diameter of 0.18mm in the pipe of beryllium copper with 1.0mm and a bore of 0.2mm, and the periphery section whose diameter is 0.2mm obtained the probe pin material of

the clad line which the interior becomes from palladium with beryllium copper. Subsequently, nickel plating was performed to the opposite side machined as one side was typically shown in drawing 2 , after attaching a taper by machining, the side machined after that was bent, and it considered as the probe pin. Thus, lead wire was soldered and the probe card was obtained, after joining to a substrate, as the obtained probe pin was typically shown in drawing 1 .

[0009] When the electrode terminal performed electrical-characteristics evaluation of the semi-conductor of a golden pad using this probe card, there is no increment in the contact resistance at the tip of a probe pin with time, and the spring property is also excellent, and the good result was obtained.

[0010] It passed [the 2nd example] outside, the wire drawing was carried out by the wire drawing machine like the 1st example after inserting a platinum wire with a diameter of 0.18mm in the pipe of 1.0mm and SUS316 stainless steel with a bore of 0.2mm, and the periphery section whose diameter is 0.2mm obtained the probe pin material of the clad line which the interior becomes from platinum with SUS316 stainless steel. Subsequently, nickel plating was performed to the opposite side which machined one side after attaching a taper by machining, the side machined after that was bent, and it considered as the probe pin. Thus, lead wire was soldered and the probe card was obtained, after joining the obtained probe pin to a substrate like the 1st example.

[0011] When the electrode terminal performed electrical-characteristics evaluation of the semi-conductor of a golden pad using this probe card, there is no increment in the contact resistance at the tip of a probe pin with time, and the spring property is also excellent, and the good result was obtained.

[0012]

[Effect of the Invention] According to this invention, while there is no increment in the contact resistance at the tip of a probe pin which is the fault of the conventional probe pin made from beryllium copper with time, the probe pin which was excellent in the spring property can be obtained. Moreover, a reliable probe card can be obtained using this probe pin. In addition, the probe pin concerning this invention can be used also as a probe pin of vertical molds, such as not only the probe pin of a needle mold but an elapid mold.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the mimetic diagram of the probe card which used the probe pin of a needle mold.
[Drawing 2] It is the cross section of the probe pin concerning this invention.
[Description of Notations]
1 Palladium
2 Beryllium Copper
3 Nickel Plating
4 Probe Card Substrate
5 Lead Wire
6 Probe Pin

[Translation done.]

DERWENT-ACC-NO: 2002-152274

DERWENT-WEEK: 200220

TITLE: Probe pin for probe card used in examining liquid crystal display, has periphery cladding made of metal with sufficient spring property and inner portion made of gold, beryllium bronze, palladium or its alloys

PATENT-ASSIGNEE: BRAZING KK[BRAZN]

PRIORITY-DATA: 2000JP-0197280 (May 29, 2000)

PATENT-FAMILY:

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INT-CL (IPC): G01R001/067, G01R031/26 , H01L021/66

ABSTRACTED-PUB-NO: JP2001337110A

BASIC-ABSTRACT:

NOVELTY - The probe pin has inner portion made of gold, beryllium bronze, palladium, or its alloy and periphery cladding made of a metal which has sufficient spring property.

DETAILED DESCRIPTION - An INDEPENDENT CLAIM is also included for probe card.

USE - For probe card (claimed) in electric evaluation examination of a semiconductor, a liquid crystal display device, or various wiring boards.

ADVANTAGE - Enables to obtain a reliable probe card by using the probe pin with outstanding spring property and without time dependent increase in contact resistance.

Au-Pd

DESCRIPTION OF DRAWING(S) - The figure shows a cross sectional model of the
probe pin.

CHOSEN-DRAWING: Dwg.2/2

TITLE-TERMS: PROBE PIN PROBE CARD LIQUID CRYSTAL DISPLAY PERIPHERAL CLAD MADE
METAL SUFFICIENT SPRING PROPERTIES INNER PORTION MADE GOLD BERYLLIUM BRONZE PALLADIUM ALLOY

DERWENT-CLASS: S01 U11

EPI-CODES: S01-H03; U11-F01C1; U11-F01D1;

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// Ｇ０１Ｒ　31/26		Ｇ０１Ｒ　31/26	Ｊ	４Ｍ１０６

審査請求　未請求　請求項の数２　書面　（全３頁）

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AD01 AE01 AE03 AF07
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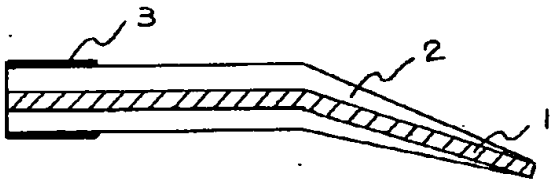
(54)【発明の名称】　プローブピンおよびプローブカード

(57)【要約】
【課題】　バネ特性が優れ、また接触抵抗の経時的な増加のないプローブカード用プローブピンおよび信頼性の高いプローブカードを提供する。
【解決手段】　内部が貴金属あるいはその合金よりなり、外周部はバネ特性の良い金属よりなるクラッド線をプローブピンとする。また、該プローブピンをプローブカードに使用する。



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【特許請求の範囲】

【請求項1】　プローブカードに使用するプローブピンにおいて、内部が貴金属あるいはその合金よりなり、外周部はバネ特性の良い金属よりなるクラッド線であることを特徴としたプローブピン。

【請求項2】　特許請求の範囲請求項1を使用したことを特徴とするプローブカード。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】本発明は、半導体や液晶表示装置あるいは各種配線基板の電気的な評価試験に使用するプローブカードおよびそれに好適なプローブピンに関する。

【0002】

【従来の技術】従来より、半導体や液晶表示装置等の電気的な評価試験には図1に示すようなニードル型のプローブピンを使用したプローブカードが使用されている。プローブカード用プローブピンとしては、試験対象物である半導体や液晶表示装置の電極端子であるパッドが金である場合、ベリリウム銅やパラジウムあるいはその合金が使用されている。

【0003】

【発明が解決しようとする課題】ベリリウム銅を使用したプローブピンは、バネ特性は良いものの先端が経時的に酸化、腐食し接触抵抗が増加するため従来金メッキを施していたが、使用回数が増えるに従って金メッキが摩耗し接触抵抗が増加するという不具合があった。一方、パラジウムやその合金は経時変化による接触抵抗の増加はないが、バネ特性が悪いという不具合があった。

【0004】本発明は、上述した従来のプローブカード用プローブピンの問題点を解決するためになされたもので、バネ特性が優れ、また接触抵抗の経時的な増加のないプローブピンおよび信頼性の高いプローブカードを提供することを目的としている。

【0005】

【課題を解決するための手段】本発明に係るプローブピンは、内部が貴金属あるいはその合金よりなり、外周部はバネ特性の良い金属よりなるクラッド線であることを特徴としている。また、本発明のプローブカードは内部が貴金属あるいはその合金よりなり、外周部はバネ特性の良い金属よりなるクラッド線をプローブピンに使用したことを特徴としている。

【0006】プローブピンの内部を貴金属あるいはその合金とすることにより、電気的な接触部である先端の経時的な酸化腐食による電気抵抗の増加をなくすことができるとともに、外周部をバネ特性の良い金属材料とすることにより電気的特性と機械的特性を併せ持つことができる。

【0007】本発明に係るプローブピンの内部の貴金属としては、金、白金、パラジウムおよびこれらの合金が

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望ましい。また、外周部はバネ特性の良い金属材料であれば良く、ステンレス鋼でも良いが、ベリリウム銅が望ましい。

【0008】

【発明の実施の形態】以下、本発明の実施例について説明する。

［第1の実施例］外径1．0mm、内径0．2mmのベリリウム銅のパイプに直径0．18mmのパラジウム線を挿入後、伸線機で伸線し、直径が0．2mmの外周部がベリリウム銅で内部がパラジウムよりなるクラッド線のプローブピン素材を得た。次いで、片側を機械加工でテーパーをつけた後、図2に模式的に示したように機械加工した反対側にニッケルメッキを施し、その後機械加工した側を折り曲げてプローブピンとした。このようにして得たプローブピンを図1に模式的に示したように基板に接合した後、リード線をハンダ付けしてプローブカードを得た。

【0009】このプローブカードを使用して電極端子が金パッドの半導体の電気的特性評価を行ったところ、プローブピン先端の経時的な接触抵抗の増加がなく、またバネ特性も優れており、良好な結果を得た。

【0010】［第2の実施例］外径1．0mm、内径0．2mmのSUS316ステンレス鋼のパイプに直径0．18mmの白金線を挿入後、第1の実施例と同様に伸線機で伸線し、直径が0．2mmの外周部がSUS316ステンレス鋼で内部が白金よりなるクラッド線のプローブピン素材を得た。次いで、片側を機械加工でテーパーをつけた後、機械加工した反対側にニッケルメッキを施し、その後機械加工した側を折り曲げてプローブピンとした。このようにして得たプローブピンを第1の実施例と同様に基板に接合した後、リード線をハンダ付けしてプローブカードを得た。

【0011】このプローブカードを使用して電極端子が金パッドの半導体の電気的特性評価を行ったところ、プローブピン先端の経時的な接触抵抗の増加がなく、またバネ特性も優れており、良好な結果を得た。

【0012】

【発明の効果】本発明によれば、従来のベリリウム銅製プローブピンの不具合であるプローブピン先端の経時的な接触抵抗の増加がないとともにバネ特性の優れたプローブピンを得ることができる。また、このプローブピンを使用して信頼性の高いプローブカードを得ることができる。なお、本発明に係るプローブピンはニードル型のプローブピンだけでなく、コブラ型等の縦型のプローブピンとしても使用できる。

【図面の簡単な説明】

【図1】ニードル型のプローブピンを使用したプローブカードの模式図である。

【図2】本発明に係るプローブピンの断面模式図である。

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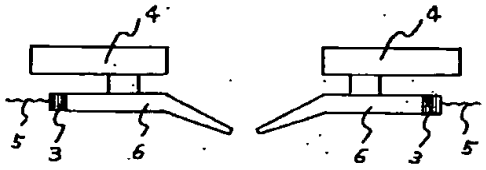
【符号の説明】

1　パラジウム
2　ベリリウム銅
3　ニッケルメッキ
4　プローブカード基板
5　リード線
6　プローブピン

【図1】



【図2】